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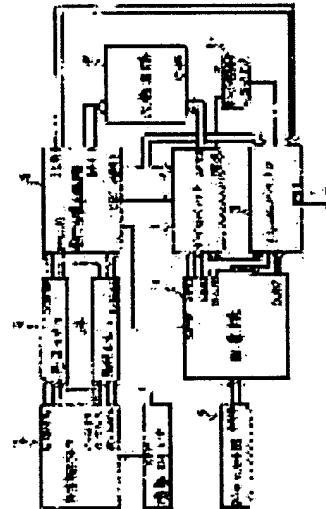
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(54) METHOD FOR SYNTHESIZING CAMERA PHOTOGRAPHING PICTURE AND COMPUTER GENERATING PICTURE

(57)Abstract:

PURPOSE: To obtain a picture not existing actually and to decrease the input work of object data by comparing the depth of a camera photographing picture with the depth of a computer generating picture for respective picture elements of a picture and remaining the picture information at a side having a close depth.

CONSTITUTION: A distance (depth) from the dislocation of a position up to a spot on the picture of the same spot on two pictures photographed by two right and left cameras for which the specified dimension of a stereoscopic vision camera 2 is separated is calculated 5, this is executed for a picture element to form the picture and thus, color information and depth information for respective picture elements are obtained. On the other hand, even concerning the picture generated by a computer 7, a picture is generated from an object described by the three-dimension, outputted as the color information and depth information for respective picture elements, the depth information is compared at every picture element of the same position as these camera photographing pictures with computer generating pictures and the color information at the side having a close depth is left. Thus, the camera photographing picture and the computer generating picture can be synthesized and the synthesizing picture without the sense of incompatibility can be easily obtained.



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CLAIMS

(57) [Claim(s)]

[Claim 1] The synthetic approach of a camera image pick-up image and a computer generation image characterized by to also constitute the image which computes the image information which consists of depth information and color information for every pixel, and generates by the computer from the left-eye image photoed and obtained with a stereoscopic-vision camera, and a right eye image from depth information and color information for every pixel, and for a synthetic image to consist of color information on a side with the small depth value of the pixel to which both images correspond.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[Industrial Application]**

This invention relates to the synthetic approach of the suitable camera photography image for generation of the image which is applied to the image composition approach, especially does not exist really, and a computer generation image.

[Description of the Prior Art]

The synthetic approach according [the input approach of other images to the conventional camera input image] to wipe and the synthetic approach by the chroma-key were used. These approaches need to specify a synthetic field for other two-dimensional images as a ***** sake to up to a two-dimensional image at a precision. For this reason, for example by the approach by the chroma-key, the synthetic field is specified in the background color. In addition, these image composition approaches are stated to the 154th page, for example from the 147th page (November, Showa 59) of work "computer imaging" Corona Publishing ** edited by Masahiko Machida.

[Problem(s) to be Solved by the Invention]

since the above-mentioned conventional technique specifies the field to compound -- the image before composition -- complicated -- debt ***** -- the composition whose image composition whose composition [like] included the distance of the image a difficult top and before composition consideration is not carried out but maintains an objective context -- it can do -- inside ****. The approach composition with the image which ***** photoed with this computer generation image and camera also specifies a synthetic field is adopted so that a complicated image can furthermore be recently generated using a computer, and the same problem as the above is *****.

The object of this invention is to offer the synthetic approach of a camera photography image and a computer generation image which can compound the image photoed with the camera, and the image generated by the computer simple.

[The means for solving a technical problem]

The above-mentioned object is photoed as ***** which has depth so that human being may look at the image photoed with a camera with two cameras from which only the convention distance which constitutes a stereoscopic vision camera was separated. Therefore, depth is calculated to be [how many the same points] separated with the image of two sheets photoed with the two cameras. It asks also for the image generated by one calculating machine as an image which has depth by the approach called the ***** depth buffer method. The depth of a camera photography image is compared with the depth of a computer generation image for every pixel of a screen, and it is attained by leaving the image information (color information) of a side with near depth by the synthetic approach of a camera photography image and a computer generation image which generates a synthetic image.

[Function]

The synthetic approach of the above-mentioned camera image pick-up image and a computer generation image The distance (depth) from a gap of the location on the image of the same point on the image of two sheets photoed with two cameras of the right and left in which the stereoscopic vision camera carried out convention ***** to this point is computed. Since an image is generated from the body described according to the three dimension also about the image which acquires the color information and depth information for every pixel, and is generated by one computer by performing this for every pixel which forms an image Can output as the color information and depth information for every pixel, and depth information is compared for every pixel of the same location of these camera photography images and a computer generation image. By compounding a camera photography image and a computer generation image, as it leaves the color information on a side with near depth, a synthetic image without sense of incongruity can be obtained easily.

[Example]

Figs. 1 and 2 explain one example of this invention below.

Drawing 1 is a flow chart showing one example of the synthetic approach of a camera photography image and a computer generation image by this invention. A **** intermediary ***** computer graphics image is made from step 1a of drawing 1 for the image generation by the computer, and this image is memorized to a frame buffer 1 and a depth buffer 1 as the color information and depth information for every image

by step 1b, respectively. On the other hand, an image with depth information is photoed with a stereoscopic vision camera by step 1c, and the color information and depth information for every image on this image are memorized to a frame buffer 2 and a depth buffer 2 by step 1d, respectively. Next, depth information is compared for every pixel which is in the jack per line of a depth buffer 1 and a depth buffer 2 by step 1e, and the color information on the frame buffers 1 or 2 of a near side is memorized to a frame buffer 3. Thus, a synthetic image is generated on a frame buffer 3 by step 1f.

Drawing 2 is equipment configuration drawing showing one example of the synthetic approach of a camera photography image and a computer generation image by this invention. Therefore, photo electric translation of the image information which took a photograph with the stereoscopic vision camera 2 which consists of two cameras which have detached and arranged only the convention dimension, and was photoed with two cameras the left and on the right of this stereoscopic vision camera 2 is carried out to the photography signal SGN from the photography switch 1 of drawing 2, and left eye output L-DATA and right eye output R-DATA are outputted to it. left eye output L-DATA and right eye output R-DATA which are outputted to the left eye memory 3 therefore initialized from the stereoscopic vision camera 2 to reset-signal C-RST in advance here, and the right eye memory 4, respectively — synchronizing signal C-CLK from the stereoscopic vision camera 2 — therefore, it memorizes. On the other hand, data K-DATA inputted from the data input means 6, such as a keyboard, and a mouse, a joy stick, is imaged by the computer 7, and this image information is outputted to a frame buffer 8 and a depth buffer 9, respectively as the color information CLR2 and the depth information DPT2 for every pixel. The color information CRT 2 and the depth information DPT2 for every pixels of these are memorized to the memory location of the frame buffer 8 specified at the address ADR 2 of the pixel simultaneously outputted from a calculating machine 7, and a depth buffer 9 synchronizing with timing signal G-CLK from a calculating machine 7, respectively.

If the image composition start signal STRT is outputted to the depth calculation circuit 5 the whole pixel from a computer 7 in this condition, edit signal E-CLK will be outputted to the left eye memory 3 and the right eye memory 4 from the depth calculation circuit 5 the whole pixel, and left eye output L-DATA and right eye output R-DATA will be outputted to the depth calculation circuit 5 the whole pixel from this left eye memory 3 and the right eye memory 4, respectively. Left eye output L-DATA is outputted to a frame buffer 8 as it is as color information CLR1 for every pixel at

the same time the depth information DPT1 for every pixel is computed the whole pixel in the depth calculation circuit 5 from these left eye output L-DATA and right eye output R-DATA and it is outputted to a comparison circuit 10. However, the color information CLR1 for every image should just choose one of left eye output L-DATA and right eye output R-DATA. The address ADR 1 of an output pixel is outputted to a frame buffer 8 and a depth buffer 9 from the depth calculation circuit 5 the whole pixel at such outputs and coincidence, and the depth information DPT3 on this address is outputted to a comparison circuit 10 from a depth buffer 9 synchronizing with the valid signal OE1 of these outputs. Two kinds of this depth information DPT1 is compared with the depth information DPT3 in a comparison circuit 10. When the depth information DPT1 is smaller (i.e., when the direction which is the applicable pixel of a camera photography image is located rather than the applicable pixel of a computer generation image in near), the memory rewriting signal CHG is outputted to AND circuit 11 from a comparison circuit 10. Synchronizing with the synchronization signal OE2 outputted to AND circuit 11, the rewriting synchronizing signal SLCT of AND circuit 11 is outputted to a frame buffer 8 from the DEBUSU buffer 9. Thereby, the color information CLR2 on the applicable pixel on a frame buffer 8 is rewritten by the color information CLR1 which is an applicable pixel. Therefore, the synthetic image OUT of a camera photography image and a computer generation image can be obtained on a frame buffer 8 to repeat these processings on the whole screen. In addition, the frame buffer 8 and the depth buffer 9 are constituted at a time from one piece by this example, respectively.

[Effect of the Invention]

Since the body image of the scene by camera photography or actual existence and the imagination image generated by the computer are compoundable simple according to this invention, one can obtain a camera photography image and the image which is *** and does not carry out intermediary actual existence, and two have the effectiveness that the huge body entry-of-data activity which is needed when only a computer generates an image is mitigable by substituting a camera photography image etc.

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DESCRIPTION OF DRAWINGS**[Brief Description of the Drawings]**

The flow chart showing [1] one example of this invention and drawing 2 are equipment configuration drawings showing one example of this invention.

1 [.. Right eye memory, 5 / .. It is a depth calculation circuit and 6 the whole pixel. / .. A data input means, 7 / .. A calculating machine, 8 / .. A frame buffer, 9 / .. A depth buffer, 10 / .. A comparison circuit, 11 / .. AND circuit.] A photography switch, 2 .. A stereoscopic vision camera, 3 .. Left eye memory, 4

[Translation done.]